Amendments to the claims:

This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) Charge pump apparatus for generating an output voltage supply within a circuit, comprising:

a) a transfer capacitor;

b) a plurality of transfer capacitor coupling switches, each switchable between a conducting state and a nonconducting state under control of at least one charge pump clock output; and

c) a charge pump clock generating circuit including a ring oscillator comprising an odd number of not more than three inverting driver sections cascaded sequentially in a ring such that each driver section has an output coupled to a next driver section input, wherein a first driver section is next after a last driver section and one of the driver section outputs constitutes a particular charge pump clock output controlling at least one of the transfer capacitor coupling switches, and wherein each driver section includes

i) circuitry configured as an active current limit to limit a rate of rise of voltage at the driver section output, and

ii) circuitry configured as an active current limit to limit a rate of fall of voltage at the driver section output;

d) wherein the plurality of transfer capacitor coupling switches are coupled to the transfer capacitor, and are controlled so as to couple the transfer capacitor to a voltage source during periodic first times, and to couple the transfer capacitor to the output voltage supply during periodic second times that are not concurrent with the first times.

2. (Currently Amended) The apparatus of Claim 68 ~~Claim 1~~, wherein the plurality of transfer capacitor coupling switches are under control of the particular charge pump clock output.

3. (Previously Presented) The apparatus of Claim 2, further comprising coupling circuitry configured to couple the particular charge pump clock output as a signal to each of the transfer capacitor coupling switches without increasing a rate of voltage rise or fall of the signal.

4. (Currently Amended) The apparatus of Claim 68 ~~Claim 1~~, further comprising a coupling circuit configured to couple the particular charge pump clock output as a signal to the at least one transfer capacitor coupling switch without increasing a rate of voltage rise or fall of the signal.

5. (Currently Amended) The apparatus of Claim 68 ~~Claim 1~~, further comprising a capacitive coupling circuit configured to couple one of the at least one charge pump clock outputs to a control node of one of the plurality of ~~a~~ transfer capacitor coupling switches.

6. (Previously Presented) The apparatus of Claim 2, further comprising corresponding capacitive coupling circuits to couple a control node of each of the plurality of transfer capacitor coupling switches to the particular charge pump clock output.

7. (Currently Amended) The apparatus of Claim 6, wherein none of the corresponding capacitive coupling circuits is configured to conduct substantial charge to the transfer capacitor.

8. (Previously Presented) The apparatus of Claim 5, wherein the capacitive coupling circuit does not conduct substantial charge to the transfer capacitor.

9. (Currently Amended) The apparatus of Claim 68 ~~Claim 1~~, wherein the active current limit circuitry of (c)(i) and (c)(ii) is further configured to limit source and sink currents, conducted by each driver section within the charge pump clock generating circuit, to substantially identical magnitudes.

10. (Currently Amended) The apparatus of Claim 68 ~~Claim 1~~, further comprising coupling substantial charge into the transfer capacitor via the charge pump clock output.

11. (Previously Presented) Charge pump apparatus for generating an output voltage supply within a circuit, comprising:

a) a transfer capacitor;

b) a plurality of transfer capacitor coupling switches, each switchable between a conducting state and a nonconducting state under control of a charge pump clock output and including

i) a common discharge switch disposed between a terminal of the transfer capacitor and a common reference connection of the output voltage supply, and having a first control node AC impedance, and

ii) an output supply discharge switch disposed between an opposite terminal of the transfer capacitor and a connection of the output voltage supply opposite the common reference connection, and having a second control node AC impedance at least twice the first control node AC impedance; and

c) a charge pump clock generating circuit including

i) circuitry configured to limit a rate of rise of the charge pump clock output, and

ii) circuitry configured to limit a rate of fall of the charge pump clock output;

d) wherein the transfer capacitor coupling switches are coupled to the transfer capacitor, and are controlled so as to couple the transfer capacitor to a voltage source during periodic first times, and to couple the transfer capacitor to the output voltage supply during periodic second times that are not concurrent with the first times.

12. (Previously Presented) Charge pump apparatus within a monolithic integrated circuit for generating an output voltage supply, comprising:

a) a transfer capacitor coupled alternately between source connections and output connections;

b) a plurality of active switches, each switchable between a conducting state and a nonconducting state under control of at least one charge pump clock output to couple charge, which is not substantially conducted by the charge pump clock output, from the source connections to the output connections;

c) a charge pump clock generating circuit including an active driver circuit configured to both source current to and sink current from the charge pump clock output to cause a voltage waveform of the charge pump clock output to be substantially sine-like due to

i) circuitry configured to limit source current provided by the active driver circuit to the charge pump clock output, and

ii) circuitry configured to limit current sunk from the charge pump clock output by the active driver circuit.

13. (Currently Amended) The apparatus of Claim 12, wherein the charge pump clock generating circuit c) further comprises a discrete capacitive element coupled to the charge pump clock output ~~driver output node~~ and configured to reduce voltage rates of change at the charge pump clock output ~~driver output node~~.

14. (Currently Amended) The apparatus of Claim 12, wherein the charge pump clock generating circuit includes a plurality of active driver circuits each configured to both source and sink current with respect to a corresponding driver output node, and wherein the charge pump clock generating circuit includes circuitry to limit the current source capacity of each of the active driver circuits and circuitry to limit the current sink capacity of each of the active driver circuits with respect to the corresponding driver output node.

15. (Currently Amended) The apparatus of Claim 12, further comprising one or more capacitive coupling networks configured to couple one of the at least one charge pump clock outputs to a control node of at least one of the plurality of ~~an~~ active switches.

16. (Original) The apparatus of Claim 12, wherein the charge pump clock generating circuit is configured as a current-starved ring oscillator.

17. (Original) The apparatus of Claim 12, wherein the source current circuitry c) i) and the sink current circuitry c) ii) are configured to limit source and sink currents to a substantially identical magnitude.

18. (Previously Presented) Charge pump apparatus for generating an output voltage supply within a monolithic integrated circuit, comprising:

a) a transfer capacitor;

b) one or more source switching devices disposed in series between the transfer capacitor and a voltage source to convey transfer current to the transfer capacitor from the voltage source when conducting;

c) one or more output switching devices disposed in series between the transfer capacitor and the output voltage supply to convey transfer current from the transfer capacitor to the output voltage supply when conducting; and

d) a charge pump clock generating circuit configured to provide a single-phase charge pump clock output coupled passively, without conveying substantial transfer current, to control nodes of each of the source switching devices to cause conduction during charge periods and nonconduction during discharge periods for all of the source switching devices, the charge pump clock output further coupled passively, without conveying substantial transfer current, to control nodes of each of the output switching devices to cause nonconduction during the charge periods and conduction during the discharge periods for all of the output switching devices, wherein the charge periods alternate with, and do not overlap, the discharge periods.

19. (Currently Amended) The apparatus of Claim 18, which includes a first charge pump having at least a first example of each recited feature, further comprising a second charge pump stage including:

e) a second transfer capacitor;

f) one or more second-source switching devices disposed in series between the second transfer capacitor and a second voltage source; and

g) one or more second-output switching devices disposed in series between the second transfer capacitor and a second output voltage supply;

h) wherein the charge pump clock output is coupled to all of the second-source switching devices to cause conduction during the charge periods and nonconduction during the discharge periods, and is coupled to all of the second-output switching devices to cause nonconduction during the charge periods and conduction during the discharge periods.

20. (Previously Presented) The apparatus of Claim 18, further comprising circuitry configured to reduce voltage change rates of the charge pump clock output during both positive and negative transitions compared to an absence of such circuitry such that the charge pump clock output voltage is substantially sine-like.

21. (Previously Presented) Charge pump apparatus for generating an output voltage supply within a circuit, comprising:

a) a transfer capacitor;

b) one or more source switching devices disposed in series between the transfer capacitor and a voltage source;

c) a first output switching device having a first device area disposed between a first terminal of the transfer capacitor and the output voltage supply, and a second output switching device disposed between a common reference connection of the output voltage supply and a second terminal of the transfer capacitor opposite the first terminal of the transfer capacitor, having a second device area that is greater than double the first device area; and

d) a charge pump clock generating circuit configured to provide a single-phase charge pump clock output coupled to all of the source switching devices to cause conduction during charge periods and nonconduction during discharge periods for all of the source switching devices, the charge pump clock output further coupled to all of the output switching devices to cause nonconduction during the charge periods and conduction during the discharge periods for all of the output switching devices.

22. (Previously Presented) The apparatus of Claim 18, wherein the charge pump clock generating circuit (d) further comprises circuitry configured to limit currents conducted by each amplifying driver circuit in the charge pump clock generating circuit.

23. (Previously Presented) The apparatus of Claim 22, further comprising a discrete capacitive device coupled to an output of one of the amplifying driver circuits to limit a rate of voltage change of the driver circuit output.

24. (Previously Presented) Charge pump apparatus for generating an output voltage supply within a monolithic integrated circuit, comprising:

a) a transfer capacitor for conveying charge from a voltage source to the output voltage supply;

b) one or more source switching devices disposed in series between the transfer capacitor and the voltage source, each having a corresponding control node that is substantially isolated from both the transfer capacitor and the voltage source;

c) one or more output switching devices disposed in series between the transfer capacitor and the output voltage supply, each having a corresponding control node that is substantially isolated from both the transfer capacitor and the voltage source; and

d) a capacitive coupling circuit coupling a charge pump clock output to one of the control nodes corresponding to a source switching device or to an output switching device.

25. (Previously Presented) The apparatus of Claim 24, wherein the capacitive coupling circuit is a first capacitive coupling circuit coupling the charge pump clock output to a source switching device control node, and further comprising a second capacitive coupling circuit coupling the charge pump clock output to an output switching device control node.

26. (Previously Presented) The apparatus of Claim 25, wherein each of the capacitive coupling circuits includes biasing circuitry configured such that an average control voltage causes a switching device to which it is coupled to be substantially nonconductive.

27. (Previously Presented) The apparatus of Claim 25, wherein all source switching devices disposed in series between the transfer capacitor and the voltage source, and all output switching devices disposed in series between the transfer capacitor and the output voltage, are capacitively coupled to the charge pump clock output.

28. (Previously Presented) A method of generating an output supply from a charge pump incorporated within a monolithic integrated circuit by transferring charge from a source voltage to a transfer capacitor ("TC") alternately with transferring charge from the TC to the output supply, wherein a TC-coupling switch ("TCCS") circuit is a switching circuit of the charge pump configured to couple the TC to a supply under control of a charge pump clock, the method comprising:

a) coupling the TC to the output supply during discharge periods via a discharging TCCS circuit under control of a first charge pump clock output; and

b) actively limiting a rate of voltage change of the first charge pump clock output during both positive transitions and negative transitions such that a voltage of the first charge pump clock output is substantially sine-like.

29. (Original) The method of Claim 28, further comprising

c) coupling the TC to the source voltage via a charging TCCS circuit, under control of a second charge pump clock output, during charge periods that nonoverlappingly alternate with the discharge periods; and

d) actively limiting a rate of voltage change of both positive and negative transitions of the second charge pump clock output.

30. (Original) The method of Claim 29, wherein the first charge pump clock output is the second charge pump clock output.

31. (Previously Presented) The method of Claim 30, further comprising controlling all TCCS circuits by means of the first charge pump clock output.

32. (Previously Presented) The method of Claim 31, further comprising coupling the TC to a connection of the source voltage during a charging period via the charge pump clock output.

33. (Original) The method of Claim 28, further comprising limiting a current drive capacity of the charge pump clock output by means of a current limiting circuit.

34. (Original) The method of Claim 28, further comprising coupling the first charge pump clock output to a control node of a TCCS circuit via a capacitive coupling circuit.

35. (Previously Presented) The method of Claim 28, wherein actively controlled TCCS circuits each have an associated control node, the method further comprising coupling the associated control node of each of the actively controlled TCCS circuits to the first charge pump clock output via a corresponding capacitive coupling circuit.

36. (Previously Presented) The method of Claim 28, wherein a first clock generator driver circuit is a driver circuit functionally incorporated in a first clock generator circuit configured to generate the first charge pump clock output, the method further comprising:

c) limiting source currents from a particular first clock generator driver circuit by means of a first current limiting circuit; and

d) limiting sink currents into the particular first clock generator driver circuit by means of a second current limiting circuit.

37. (Previously Presented) The method of Claim 36, further comprising limiting the source currents and the sink currents of the particular first clock generator driver circuit to substantially identical magnitudes.

38. (Original) The method of Claim 36, wherein the first current limiting circuit comprises a current mirror device, and the second current limiting circuit comprises a different current mirror device.

39. (Original) The method of Claim 37, further comprising limiting source currents and sink currents from all first clock generator driver circuits.

40. (Previously Presented) The method of Claim 28, further comprising generating the first charge pump clock output by means of a current-starved ring oscillator including not more than three inverting driver sections coupled in a ring.

41. (Original) The method of Claim 28, further comprising coupling the TC to the source voltage or to the output supply in part via a passive TCCS circuit.

42. (Previously Presented) A method of generating an output supply from a charge pump by transferring charge from a source voltage to a transfer capacitor ("TC") alternately with transferring charge from the TC to the output supply, wherein a TC-coupling switch ("TCCS") circuit is a switching circuit of the charge pump configured to couple the TC to a supply under control of a charge pump clock, the method comprising:

a) coupling the TC to the output supply during discharge periods via a discharging TCCS circuit under control of a first charge pump clock output;

b) actively limiting a rate of voltage change of the first charge pump clock output during both positive transitions and negative transitions;

c) coupling a first terminal of the TC to a common reference connection of the output supply via a discharge common TCCS;

d) coupling a second opposite terminal of the TC to an output supply connection opposite the common reference connection via a discharge output TCCS; and

e) fabricating the discharge output TCCS to have a control node AC impedance at least double a control node AC impedance of the discharge common TCCS.

43. (Currently Amended) A method of generating an output supply by alternately transferring charge from a source voltage to a transfer capacitor ("TC"), and from the TC to the output supply, the method comprising:

a) coupling the TC to the output supply during discharge periods via a discharging switch circuit under control of a first charge pump clock output;

b) limiting source current provided to each inverting driver output node of a current-starved ring oscillator having not more than three inverting driver stages within a first charge pump clock generator circuit by means of a corresponding source current-limiting circuit; and

c) limiting sink current drawn from each of the inverting driver output nodes by ~~the driver circuit~~ by means of a corresponding sink current-limiting circuit;

~~d)~~ wherein the inverting driver output node of one of the not more than three inverting driver stages of the first charge pump clock generator circuit is the first charge pump clock output.

44. (Currently Amended) The method of Claim 69 ~~Claim 43~~, further comprising

d) coupling the TC to the source voltage via a charging switch circuit, under control of a second charge pump clock output, during charge periods alternating nonconcurrently with the discharge periods.

45. (Currently Amended) The method of Claim 69 ~~Claim 43~~, further comprising coupling a capacitor to the driver output node of the first charge pump clock generating circuit to limit voltage transition rates of the driver output node.

46. (Currently Amended) The method of Claim 69 ~~Claim 43~~, further comprising coupling the first charge pump clock output to a control node of the discharging switch circuit and/or to a control node of a charging switch via a corresponding capacitive coupling circuit.

47. (Currently Amended) The method of Claim 69 ~~Claim 43~~, further comprising coupling the first charge pump clock output to a control node of the discharging switch circuit and/or to a control node of a charging switch via a corresponding capacitive coupling circuit.

48. (Currently Amended) The method of Claim 69 ~~Claim 43~~, further comprising coupling the first charge pump clock output as a signal to a control node of the discharging switch circuit via a network that is not configured to increase rates of voltage change of the signal.

49. (Previously Presented) A method of generating an output supply within a monolithic integrated circuit by alternately transferring charge from a voltage source to a transfer capacitor ("TC"), and from the TC to the output supply, the method comprising:

a) coupling the TC to the output supply during discharge periods via a TC discharging switch under control of a single phase charge pump clock output that is passively coupled to a control node of the TC discharging switch and substantially isolated from the TC; and

b) coupling the TC to the voltage source via a TC charging switch, during charge periods that nonoverlappingly alternate with the discharge periods, under control of the single-phase charge pump clock output that is passively coupled to a control node of the TC charging switch.

50. (Original) The method of Claim 49, wherein step a) further comprises coupling the TC to the output supply during discharge periods via a plurality of TC discharging switches under control of the single phase charge pump clock output.

51. (Currently Amended) The method of Claim 50, wherein step b) further comprises coupling the TC to the voltage ~~a voltage~~ source via a plurality of TC charging switches under control of the single phase charge pump clock output.

52. (Currently Amended) A method of generating an output supply by alternately transferring charge from a voltage source to a transfer capacitor ("TC"), and from the TC to the output supply, the method comprising:

a) coupling the TC to the output supply during discharge periods via a plurality of TC discharging switches under control of the single phase charge pump clock output;

b) coupling the TC to the voltage source via a TC charging switch, during charge periods that nonoverlappingly alternate with the discharge periods, under control of the single-phase charge pump clock output;

c) coupling a first TC discharging switch ~~device~~ in series between a first node of the TC and a common reference connection of the output supply;

d) coupling a second TC discharging switch in series between a second node of the TC opposite the first node and a connection of the output supply opposite the common reference connection; and

e) fabricating the second TC discharging switch to have a control node AC impedance at least twice as large as a control node AC impedance of the first discharging switch ~~device~~.

53. (Previously Presented) The method of Claim 49, wherein step b) further comprises coupling the TC to the voltage source via a plurality of TC charging switches under control of the single phase charge pump clock output.

54. (Original) The method of Claim 49, further comprising:

c) coupling a second TC to a second voltage source via a second TC charging switch under control of the charge pump clock output; and

d) coupling the second TC to a second output supply via a second TC discharging switch under control of the charge pump clock output.

55. (Previously Presented) The method of Claim 54, further comprising coupling the charge pump clock output to a control node of each TC charging switch, and to a control node of each TC discharging switch, via corresponding capacitive coupling circuits.

56. (Original) The method of Claim 49, further comprising coupling the charge pump clock output to a control node of each actively controllable TC charging switch, and to each actively controllable TC discharging switch, via corresponding capacitive coupling circuits.

57. (Original) The method of Claim 49, further comprising incorporating circuitry to reduce voltage change rates during both positive and negative transitions of the charge pump clock output.

58. (Original) The method of Claim 49, further comprising:

c) generating the charge pump clock output in a charge pump clock generator circuit having one or more driver circuits, and

d) limiting currents output from each driver circuit of the charge pump clock generator circuit.

59. (Previously Presented) The method of Claim 58, further comprising:

e) limiting rates of both positive and negative voltage transitions at an output node of one of the driver circuits of the charge pump clock generator circuit by coupling a capacitor to the output node of the driver circuit.

60. (Currently Amended) A method of generating an output supply within a monolithic integrated circuit by alternately transferring charge for the output supply from a source voltage to a transfer capacitor ("TC"), and from the TC to the output supply, the method comprising:

a) coupling a first charge pump clock output to a control node of a TC charging switch via a first capacitive coupling network that does not conduct a significant portion of the charge for the output;

b) coupling the TC to the source voltage during charge periods via the TC charging switch under control of the first charge pump clock output;

c) coupling a second charge pump clock output to a control node of a TC discharging switch via a second capacitive coupling network that does not conduct a significant portion of the charge for the output; and

d) coupling the TC to the output supply via the TC discharging switch during discharge periods nonconcurrently alternating with the charge periods under control of the second charge pump clock output.

61. (Original) The method of Claim 60, wherein the second charge pump clock output is the first charge pump clock output.

62. (Currently Amended) The method of Claim 61, further comprising biasing each of the capacitive coupling networks such that the TC charging or discharging switch ~~device~~ to which it is coupled is nonconductive when the charge pump clock output is at an average value of its time-varying voltage.

63. (Previously Presented) The method of Claim 62, further comprising coupling the TC to the source voltage during the charge periods via an additional second TC charging switch having a control node capacitively coupled to a corresponding second charge pump output.

64. (Currently Amended) The method of Claim 63, wherein the TC discharging switch is a first TC discharging switch and is coupled between a first node of the TC and a connection of the output supply opposite a common reference, the method further comprising coupling an opposite second node of the TC to the common ~~a common~~ reference of the output supply during the discharge periods via a second TC discharging switch having a control node AC impedance no more than half as large as a control node AC impedance of the first TC discharging switch.

65. (Previously Presented) The method of Claim 62, further comprising coupling the TC to the output supply during the discharge periods via an additional second TC discharging switch having a control node capacitively coupled to a corresponding second charge pump output.

66. (Previously Presented) The method of Claim 60, further comprising capacitively coupling a control node of each actively controllable TC coupling switch that is incorporated within a charge pump to a corresponding charge pump clock output.

67. (Previously Presented) The method of Claim 66, wherein all of the corresponding charge pump clock outputs are a common single-phase output.

68. (New) The apparatus of Claim 1, wherein the number of driver sections of the ring oscillator is not less than three.

69. (New) The method of Claim 43, wherein the number of driver sections of the ring oscillator is not less than three.

70. (New) The apparatus of Claim 18, wherein each of the source switching devices and each of the output switching devices is a transfer capacitor ("TC") switching device, each such TC switching device is either an n-channel FET or a p-channel FET, and wherein threshold voltages of all n-channel TC switching devices are substantially similar, and threshold voltages of all p-channel TC switching devices are substantially similar.

71. (New) The method of Claim 49, wherein each TC charging switch and each TC discharging switch is a TC switching device and is either an n-channel FET or a p-channel FET, and wherein threshold voltages of all n-channel TC switching devices are substantially similar, and threshold voltages of all p-channel TC switching devices are substantially similar.